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# Terms of Reference

**Technical Study on Energy Efficient Public Lighting in [Cities]**

## Background

*<Rationale for the project, cities and world energy consumption, cities and global carbon dioxide, window of opportunity, city-based carbon emissions, aims of the project, project components.>*

This consultancy entails the first round of technical due diligence for an energy efficient public street lighting project in [cities]. The outcome of the study should provide the technical and engineering specifications required to implement the program, the main technical challenges and their potential solutions, and the overall savings potential of the program.

## Detailed Tasks

Background (10%):

1. Review energy efficiency assessments conducted by the team (or any other entity), studies of different lighting technology suitable for [cities], and most recent tests of the suitability of LED lighting in [country].
2. Review best practices and lessons learned from other cities that have implemented energy efficient street lighting programs, including LED lighting.
3. Briefly describe the potential models of procurement that could be used by [cities] and the likely technical requirements to support bidding to be done by the city.

Technical studies (70%):

#### Establish the baseline.

* 1. Building on information already collected through the [tool] study, conduct an energy audit of public lighting in [cities]. Results should constitute a preliminary energy audit with technical data usable for potential procurement bidding by the city. This needs to include types of lighting points, number of the lighting points, electricity consumption by type of bulb and balance of plant, average hours of use per type of bulb, location of bulbs (residential area, tourist area, commercial area, favela, etc. - depending on the sectorization used by the city), and types of ballasts.

#### Explore efficient lighting technologies.

* 1. Report on the cost and benefits of using various efficient public lighting technologies including LED, OLED, dimmers, timers, photo sensors, public lighting management systems as specific to [cities].

#### Technology specifications and risk for LEDs.

* 1. Report on the status of the federal government’s efforts to standardize the technical specifications of LEDs in [country] and how this could affect the timing to implement a LED street lighting program.
  2. Report on the most updated information regarding LED technology risk in [country] and make a recommendation for the key issues that need to be resolved before a LED program for public street lighting can be implemented. These include metering.

#### Propose recommended technical design.

* 1. Based on results of the analysis described above, recommend the optimal solution for energy efficient street lighting in [cities] from a technical perspective. This should take into account technology risk, institutional setup, the impact of the local climate, the cost and availability of the technology, and any other relevant factors.
  2. Discuss outcomes of site inspections, necessary upgrades to existing infrastructure (e.g. the metering system), and changes to the balance of plant, if the optimal solution were to be implemented.

#### Cost of technology and benefits.

* 1. Provide an estimated range of the “all-in” cost of LEDs in [country], including the cost of equipment and cost of installation, maintenance and management of the system
  2. Quantify the benefits from LED lighting in terms of more precise energy, financial and CO2/GHG savings.

#### Feasibility to implement.

* 1. Propose a potential role out plan for [cities]
  2. Report on the market capability to implement city-wide street lighting program using the recommended technology (LED), including:

1. Availability of companies to install and maintain lamps across [cities].
2. Availability of domestic and international companies to manufacture and supply lamps across Rio and Belo Horizonte.

Coordination with other consultants (20%):

1. With the guidance of the [team leader], communicate findings from the technical study to support the consultants working on the overall project design.
2. Engage in meetings (teleconferences or in person) as needed to ensure consistency between the recommendations in the project design study with the findings from the technical study.
3. Review the draft paper from the project design study and provide comments / feedback as appropriate.

## Qualifications

1. Strong technical understanding of the efficient lighting sector, particularly of LEDs.
2. Previous experience conducting due diligence for energy efficiency projects, preferably with experience working on energy efficient street lighting projects.
3. Experience conducting energy audits in the public lighting sector
4. Good understanding of procurement in the municipalities of [cities].
5. Ability to reach out to a local and global network to gather market intelligence on the public street lighting industry.

## Period of Performance and Deliverables and timeline

Period of performance: September – December

Review summary: October 15th

Preliminary report of findings: November 15th

Final report: December 15th

## Support provided by the [donor]

1. Provide background information on studies already conducted by the [donor] on this topic and provide some examples of similar projects already implemented.
2. Facilitation of visits in [cities] and interviews with key individuals working in the public lighting sector.
3. Facilitation of conversations with relevant individuals or companies to gain market intelligence on the public street lighting industry.